SYSTEM AND METHOD FOR REGULATING LATERAL GROWTH IN LASER IRRADIATED SILICON FILMS

ABSTRACT OF THE INVENTION

A method is provided for maintaining a planar surface as crystal grains are laterally grown in the fabrication of crystallized silicon films. The method comprises: forming a film of amorphous silicon with a surface and a plurality of areas; irradiating each adjacent areas of the silicon film with a first sequence of laser pulses; and, in response to the first sequence of laser pulses, controlling the planarization of the silicon film surface between adjacent areas of the silicon film as the crystal grains are laterally grown. By controlling the number of laser pulses in the sequence, the temporal separation between pulses, and the relative intensity of the pulses, the lateral growth length characteristics of the crystal grains can be traded against the silicon film flatness. A silicon film formed by a pulsed laser sequence crystallization process is also provided.